28. $200, to Edward S. Holden, Esq., for researches on stellar spectroscopy, to be carried on at the Lick Observatory.
29. $150, to Prof. J. Kollmann, for investigations on the embryology of monkeys.
30. $25, to Prof. J. P. McMurrich, Clark University, Worcester, Mass., to study embryology of Aurelia.
31. $200, to Dr. Johannes Dewitz, Zoolog. Institute, Berlin, Germany, for researches on the laws of movement of Spermatozoa.
32. $150, to Alexander McAdie, Clark University, Worcester, Mass., for experiments on atmospheric electricity.
33. $250, to Prof. Julien Fraipont, University of Liége, Liége, Belgium, for the exploration of the cave of Engihoul.
34. $50, to Prof. M. E. Wadsworth, Houghton, Michigan, for observations on the temperature in mining-shafts.
35. $50, to Prof. A. B. Macallum, University of Toronto, Toronto, Canada, to study the digestion and absorption of chromatine.
36. $250, to Dr. G. Baur, Clark University, Worcester, Mass., for the exploration of the Galapagos Islands.
37. $300, to Prof. Edw. S. Holden, Lick Observatory, Cal., for astronomical photography.
38. $250, to Prof. Louis Henry, Louvain, Belgium, for researches on the fundamental solidarity of carbon compounds.
39. $300, to Prof. L. Hermann, Königsberg, Prussia, for phonographic experiments on vowels.
40. $50, to Prof. Alpheus Hyatt, Cambridge, Mass., for researches on the evolution of Cephalopoda.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—Convocation on Tuesday arrived at the following decision:—

"That the University accept the offer of Mr. G. J. Romanes, F.R.S., Christ Church, to give an annual sum of £25 for a lecture to be delivered once a year on some subject approved by the Vice-Chancellor relating to science, art, or literature. The lecturer to be called the Romanes Lecturer, and to be appointed by the Vice-Chancellor annually in the Michaelmas Term, the lecture to be delivered in the next following Easter or Trinity Term on a day to be fixed by the Vice-Chancellor, who shall give public notice thereof to the University in the usual manner. Also, that the thanks of the House be given to Mr. Romanes for his liberality."

We understand it was Mr. Romanes's wish that the foundation should be anonymous; but as such a course was found to be without precedent, and otherwise impracticable, he yielded the point to the University authorities.

Mr. H. T. Gerrans, Fellow of Worcester College, has been elected by the Board of the Faculty of Natural Science a member of the Committee for nominating Masters of the Schools from Hilary Term 1892 to Hilary Term 1895. Mr. C. H. Sampson, Fellow of Brasenose College, has been elected by the same Board of Faculty a member of the Committee for nominating Mathematical Honour Moderators.

SCIENTIFIC SERIALS.

A GOOD deal of interesting geological information is given in the last number of the *Izvestia* of the East-Siberian Branch of the Russian Geographical Society (vol. xxii., 2 and 3). M. Obrutcheff gives an orographical and geological sketch of the highlands of the Olekma and the Vitim, with the exploration of which he was intrusted by the mining administration. Besides the upheavals of these highlands, which have a general direction from the south-west to the north-east, M. Obrutcheff found another series of upheavals stretching west-north-west to east-south-east, the chief ridge of that system (named Kropotkin's ridge by the author) rising to the height of from 1300 to 1500 metres, and separating the tributaries of the Lena from those of the Vitim. Several lower chains seem to have the same direction. The whole series consists of metamorphic slates and limestones, intersected by granites and gneisses, and belongs to the Lower Silurian and Cambrian system, a closer definition of its age being difficult on account of a total want of fossils. M. Obrutcheff also confirms the glaciation of the whole of these highlands. The valleys are filled up with morainic deposits, with polished and striated boulders, and there are traces of inter-glacial layers. The *dômes arrondis* and the *roches moutonnées*, so familiar to the glacialist, are frequent, and the author gives interesting facts to confirm the transport of boulders at great distances over the mountain-ridges, which cannot be explained without admitting that the whole of the highlands was covered with a mighty ice-cap. The same number contains a note by the same author on the Jurassic fossil plants recently discovered on the Bureya River (a tributary of the Amur), and a list of 290 flowering plants collected by Mme. Klements in South Yeniseisk and Tomsk, and described by M. Preyn.

SOCIETIES AND ACADEMIES.

LONDON.

Chemical Society, November 5.—Mr. W. Crookes, F.R.S., Vice-President, in the chair.—The following papers were read:—The magnetic rotatory power of solutions of ammonium and sodium salts of some of the fatty acids, by Dr. W. H. Perkin, F.R.S. Ostwald has argued that the peculiar results obtained by the author in the case of solutions of acids and of ammonium salts, &c., are in accordance with the electrolytic dissociation hypothesis; and has suggested that since salts formed from weak acids are as good conductors as those formed from strong ones, we may expect in this case also, marked deviations from the calculated values. He also considers that such salts as ammonium formate, &c., when in aqueous solution would show molecular rotations which would not be the sums of the rotations of the components of the salts, as must nearly be the case if the view put forward by the author be correct, that such salts are almost entirely dissociated into acid and base. The author has obtained results which show that the rotatory powers of the ammonium and sodium salts do not vary with dilution; and on comparing the experimental values obtained in the case of ammonium salts with those afforded by the constituent acid and ammonia, as might be expected, as reduction of rotatory power always attends combination, the values are slightly less in the case of the salts. This reduction is very nearly the same as that which takes place in the formation of the corresponding ethereal salts, and as the latter are anhydrous, the results show that the values for ammonium salts in solution are practically those of the dry salts, and therefore that Ostwald's views are inapplicable.—Note on the action of water gas on iron, by Sir H. E. Roscoe and F. Scudder. Whilst making experiments on the application of water gas for illuminating purposes, the authors have observed that occasionally the Fahnehjelm comb becomes coated with a deposit of ferric oxide, and a further examination of the tips of the steatite burners showed that the deposit of ferric oxide was "coralloid," and therefore could not be produced from dust in the atmosphere. They also observe that water gas which has been standing in steel cylinders at a pressure of 8 atmospheres for about a month contains a much larger quantity of iron. A preliminary determination of the iron in this gas amounted to 2·4 milligrams per litre. Although the compound, which is doubtless the iron carbonyl of Mond and Quincke, is only present in this small quantity, the authors have succeeded in proving that it can readily be liquefied. In the discussion which followed, the Chairman referred to the fact that at the recent British Association meeting at Cardiff, Mr. Mond had exhibited specimens not only of liquid iron carbonyl, but also of a solid compound of iron with carbonic oxide. Prof. Ramsay stated that he had found that the compound of nickel with carbonic oxide was formed in the cold.—The dissociation of liquid nitrogen peroxide, by J. Tudor Cundale. The author has determined by colorimetric methods the relative amount of NO_2 formed in liquid nitrogen peroxide, (1) by dilution with chloroform, (2) by rise of temperature. He has also aseertained the absolute amounts of dioxide by comparing the colour of the liquid solution with that of the gas containing a known amount of nitrogen peroxide. The results show that, on dilution, (1) dissociation takes place very slowly at first, but more rapidly when less than 5 per cent. of the peroxide is present; (2) that solutions of the peroxide dissociate more rapidly than the pure liquid on rise of temperature.—Ortho- and para-nitro-ortho-toluidine, by A. G. Green and Dr. T. A. Lawson. The authors find that when ortho-toluidine sulphate is nitrated in a large excess of sulphuric acid at a low temperature, three isomerides are formed—namely, *para*-nitro-ortho-toluidine (about 75 per cent.), *meta*-nitro-ortho-toluidine, $C_6H_3Me(NH_2)(NO_2)[1:2:5]$ (about 3 or 4 per cent.), and *ortho*-nitro-ortho-toluidine, $C_6H_3Me(NH_2)(NO_2)[1:2:6]$ (about 20 per cent.). The separation of the ortho-nitro-ortho-toluidine from the mixture is effected by taking advantage of the greater solubility of this isomeride in slightly warm water. The authors give a table of the properties of the ortho- and para-nitro-ortho-toluidines, and of their products on reduction and other derivatives.—Researches on the gums of the arabin group: Part ii. Geddic acids—Gedda gums; the dextro-rotatory varieties, by C. O'Sullivan. The Gedda gums described consist of the calcium, magnesium, and potassium salts of gum acids, the calcium salt predominating, and more or less nitrogenous matter, which is probably combined with a true gum acid. They dissolve easily in water, forming a yellow or reddish syrup, neutral to test-paper, which is dextro-rotatory. The gum acids are obtained pure by dialyzing their acidified solution, and by fractional precipitation with alcohol. The gum acids in any one sample of gum bear a very simple relation to one another, and are closely related to the gum acids contained in other samples. A table of their relationships is given. The composition and partial constitution of any one of the gum acids which have been as yet examined may be expressed by the general formula, $C_{23}H_{38-2n}O_{22-n}.nC_{12}H_{20}O_{10}.pC_{10}H_{16}O_8$. These gum acids, when heated at 80°–100° for 10–30 minutes with a solution containing 2 per cent. H_2SO_4, are hydrolyzed, yielding arabinon and a gum acid of lower molecular weight. The gum acids thus produced closely resemble the gum acids existing in the natural gums, but are less optically active and more insoluble in weak alcohol. The most marked difference between these gum acids and those existing in the natural gums is that they are only hydrolyzed with difficulty with 2 per cent. sulphuric acid. They are, however, slowly broken down by several hours' digestion, and acids of successively lower weight are formed. The lowest stage of the hydrolysis is represented by the general equation:—

$$C_{23}H_{38-2n}O_{22-n}.nC_{12}H_{20}O_{10} + 3nH_2O = C_{23}H_{38}O_{22} + 2nC_6H_{12}O_6.$$

The compound $C_{23}H_{38}O_{22}$ has not yet been obtained in sufficient quantity for an examination of its properties. Those gum acids obtained from Gedda gum are highly dextro-rotatory, whilst those from gum arabic, although otherwise identical, are inactive.—Some compounds of the oxides of silver and lead, by Emily Aston. The author finds that on following the directions given by Wöhler for the preparation of the compound $Ag_2O,2PbO$ the product varies in composition. A substance of the composition $2Ag_2O,PbO$ is obtained when a mixture of lead and silver hydroxides is allowed to stand in presence of caustic soda, and also by precipitating the mixed nitrates of lead and silver, and exhaustively extracting with caustic soda.—The electrolysis of potassium acetate solutions, by Dr. T. S. Murray. On electrolyzing a dilute aqueous solution of potassium acetate only hydrogen and oxygen are evolved; with concentrated solutions a mixture of ethane, hydrogen, oxygen, methyl acetate, and carbon dioxide is evolved. On diluting the solution the amount of ethane decreases, at first very slowly, but finally with great rapidity. Reducing the current has a similar influence. With rise in temperature, the ethane diminishes, and ceases to be formed at 100°. In contradiction to Jahn, the author finds that the employment of a large anode reduces the yield of ethane; the largest yield is obtained with a very small anode; variations in the cathode do not influence the electrolysis. The results of the experiments are illustrated by curves. The author believes that the ethane is formed, not by partial oxidation of acetic acid, but by a simple interaction of the acetions (CH_3COO). He finds that the yields of ethane from equivalent solutions of potassium, sodium, and calcium acetates are equal.—A new method of preparing β-dinaphthylene oxide, and the constitution of its tetra-sulphonic acid, by W. R. Hodgkinson and L. Limpach. Beta-dinaphthalene oxide is obtained by heating 2 : 3′ β-naphthol-sulphonic acid to low redness; the distillate is freed from β-naphthol by extraction with alkali, and the residue crystallized from acetic acid. It crystallizes in rhombic plates, and melts at 153°. On sulphonation it yields a tetra-sulphonic acid, which is identical with the product obtained by the continued action of sulphuric acid on β-naphthol.

Linnean Society, November 5.—Prof. Stewart, President, in the chair.—On behalf of a number of subscribers, Mr. Carruthers presented to the Society a half-length portrait in oils of Sir John Lubbock, Bart., M.P., P.C., F.R.S., a former President, painted by Mr. Leslie Ward; and the remarks which he made on the services rendered to biological science by Sir John Lubbock drew from the latter a graceful acknowledgment of the honour conferred upon him.—Amongst the exhibitions which followed, Mr. E. M. Holmes showed some new marine Algæ from the Ayrshire coast; Mr. J. G. Grenfell showed some Diatoms with pseudopodia, illustrating his remarks with diagrams, upon which an interesting discussion followed.—The President exhibited and made some observations on a tooth of the walrus, which illustrated in a curious manner the periods of growth.—Mr. R. V. Sherring called attention to a large series of framed photographs which had been taken under his direction in Grenada, and illustrated the general character of the West Indian flora as well as the physical features of that particular island.—Mr. J. E. Harting exhibited a specimen of Wilson's Petrel which had been picked up in an exhausted state in the Co. Down on October 2 last, and had been forwarded for inspection by Mr. R. Patterson, of Belfast. Mr. Harting gave some account of the species, and remarked upon the unusual number of Petrels, Shearwaters, Skuas, and other marine birds which had been driven inland to a considerable distance during the recent gales.—A paper was then read by the Rev. Prof. Henslow, entitled "A Theory of Heredity based on Forces instead of any special form of Matter." The author maintained that no special form of matter (as is generally supposed) other than protoplasm is required; the latest discoveries of the organized structure of protoplasm militating against the idea of any other special form of matter. Taking illustrations from the animal and vegetable kingdoms, he inquired why two varieties of chickens fed from the first day to full growth were different? It seemed to him more probable that the results were due to different arrangements of the same kinds of molecules rather than to different kinds of "germ-plasm." *Ranunculus heterophyllis*, he pointed out, produced a "land-form" and a "water-form" according to its environment; it therefore exhibited both "heredity" and "acquired characters." As the materials of its structure were the same in both cases, the different results, he considered, must be due to different arrangements of its molecules, and must be effected by forces. The sudden appearance of stomata on the "land-form" illustrated a case of forces normally "potential" while the leaf is submerged, becoming "actual" when the leaf developed in air. After some further deductions, Prof. Henslow concluded that protoplasm and the forces bound up with it were perfectly able to do all the work of transmitting parental characters, as well as to acquire new characters, which in turn might become hereditary as well.

Physical Society, November 6.—Dr. E. Atkinson, Vice-President, in the chair.—Prof. Sydney Young read a paper on the generalizations of Van der Waals regarding "corresponding" temperatures, pressures, and volumes, in which he gave the results of an investigation made with a view of testing whether these theoretical deductions agree with experimental facts. From his virial equation,

$$\left(p + \frac{a}{v^2}\right)(v - b) = R(1 + \alpha t),$$

Van der Waals showed that, if the absolute temperatures of various substances be proportional to their absolute critical temperatures, their vapour pressures will be proportional to their critical pressures, and their volumes, both as liquid and as saturated vapour, will be proportional to their critical volumes. These deductions have now been put to the test of experiment. Some years ago, Prof. Ramsay and the author published data relating to the temperatures, pressures, and specific volumes of methyl-, ethyl-, and propyl-alcohols, ether, and acetic acid. Since then, experiments have been made on benzene and its halogen derivatives—fluor-, chloro-, bromo-, and iodo-benzene—carbon tetrachloride and stannic chloride, and in a few cases the observations have been carried to the critical points. The critical volumes being in many cases difficult to determine with any exactness, the author, instead of expressing the temperatures, pressures, and volumes of each substance in terms of their critical values, found it necessary to compare the various substances with one of them taken as a standard. Fluorbenzene was chosen as standard on account of the very simple relations observed between the monohalogen derivatives of benzene, and the fact of its critical constants (temperature, pressure, and volume) having been determined with considerable accuracy. Some of the critical constants of the various substances examined are given in the following table, the brackets indicating calculated values—

Substance.	Formula.	Temperatures in ° C.	Pressures in mms. of mercury.	Volumes in c.c.'s	
				of a gramme	molecular.
Fluorbenzene	C_6H_5F	286·55	33,912	2·43	233
Chlorobenzene ...	C_6H_5Cl	(360)	(33,912)	2·34	(262)
Bromobenzene ...	C_6H_5Br	(397)	(33,912)	1·76	(275)
Iodobenzene	C_6H_5I	(448)	(33,912)	1·47	(298)
Benzene	C_6H_6	288·5	36,395	2·82	219
Carbon tetrachloride	CCl_4	283·15	34,180		
Stannic chloride ...	$SnCl_4$	318·7	28,080		
Ether	$(C_2H_5)_2O$	194·4	27,060		
Methyl alcohol ...	CH_3OH	240·0	59,760		
Ethyl alcohol ...	C_2H_5OH	243·1	47,850		
Propyl alcohol ...	C_3H_7OH	263·7	38,120		
Acetic acid	$CH_3.COOH$	321·6	43,400	2·46	147

Other tables of experimental data—including boiling-points at corresponding pressures, vapour pressures at corresponding temperatures, molecular volumes of liquid and saturated vapours at corresponding pressures and at corresponding temperatures, and ratios calculated therefrom, accompany the paper. From these the author infers: (1) that Van der Waals's generalizations are nearly true for chloro-, bromo-, and iodobenzene when compared with fluorbenzene; (2) that for benzene, carbon tetrachloride, stannic chloride, and ether, the generalizations may only be taken as rough approximations to the truth; and (3) that for the three alcohols and acetic acid, they do not hold good at all. The tables further show that more consistent results are obtained when the comparisons are made at corresponding pressures rather than at corresponding temperatures, particularly in the case of molecular volumes of saturated vapours. The subject of saturated vapours is also treated by another method. If Van der Waals's deductions were strictly true, then the ratios of the actual densities of the saturated vapours of different substances to their theoretical densities should be equal at corresponding pressures. These ratios have therefore been calculated, and show an approximate agreement amongst benzene and its halogen derivatives, carbon tetrachloride, stannic chloride, and ether. For the other substances the agreement is less satisfactory. It is also noted that the ratio of the actual critical density to the theoretical density is for many substances about 4·4. The alcohols differing so widely from the other compounds, were compared amongst themselves instead of with fluorbenzene, with the result that somewhat closer agreement was found, but the deviations were still far outside the limits of experimental error. Of the critical constants the volumes are the most difficult to determine, because at the critical point the curves connecting temperature and volume, and pressure and volume, are parallel to the axes of volume. Accordingly, the author, in some cases, has deduced this quantity by plotting against temperature the numbers representing the ratios of the molecular volumes both of liquid and saturated vapour to those of fluorbenzene at corresponding temperatures and also at corresponding pressures. Four curves result, which should intersect at the critical temperature, and the point of intersection gives the ratio of the molecular critical volume of the substance to that of fluor-benzene. This method leads to results in fair accord with direct determinations. In the discussion which followed the reading of the paper, Prof. Ramsay said the results proved that Van der Waals's generalizations were only rough approximations, and he suggested that some force had been neglected or a term omitted from the equations. Perhaps the assumption that the molecules are incompressible was not correct. He also strongly protested against the tacit assumption of Van der Waals's laws, and deductions made therefrom, which had recently become so common, particularly in German text-books. Prof. Perry inquired whether the quantities *a*, *b*, and *α*, had been determined for different substances and found to be constant. Prof. Ramsay said that for substances in states analogous to those of perfect gases, the quantities were approximately constant, but when the liquid state was approached this was no longer true. According to Prof. Tait, the two states were not continuous. Prof. Herschel remarked that Prof. Tait had established his law on the assumption that the co-volume is four times the volume occupied by the molecules. This law, he said, had been amply verified by experiments on explosions. Dr. Burton, referring to Prof. Ramsay's remarks on the compressibility of molecules, said the law of force between attracting molecules should be accurately known before any deductions were made; and he pointed out that, at constant volume, the pressure should be proportional to the absolute temperature, if allowance be made for the negative pressure of attraction. Mr. Blakesley, in speaking of molecular forces, said he had observed that, when water is allowed to evaporate from glass, a furrow is formed in the glass, which marks out the original boundary of the liquid. To all appearance, the particles of glass are torn away by the molecular forces acting along the boundary.

Geological Society, Nov. 11.—Sir Archibald Geikie, F.R.S., President, in the chair.—The following communications were read:—On *Dacrytherium ovinum* from the Isle of Wight and Quercy, by R. Lydekker. The author described a cranium and mandible of *Dacrytherium Cayluxi* from the Quercy phosphorites, which proved the identity of this form with the *Dichobune ovina* of Owen from the Oligocene of the Isle of Wight. This species should thus be known as *Dacrytherium ovinum*. It was shown tha tthe mandible referred by Filhol to *D. Cayluxi* belongs to another animal.—A discussion followed, in which Mr. Charlesworth and Mr. E. T. Newton took part.—Supplementary remarks on Glen Roy, by T. F. Jamieson. The author discusses the conditions that preceded the formation of the Glen Roy Lake, and appeals to a rain-map of Scotland in support of his contention that the main snowfall in glacial times would be on the western mountains. He gives reasons for supposing that, previously to the formation of the lake, the valleys of the Lochaber lakes were occupied by ice, and that the period of the formation of the lakes was that of the decay of the last ice-sheet. He supports the correctness of the mapping of the terraces by the officers of the Ordnance Survey, and shows how the absence of the two upper terraces in Glen Spean and of the highest terrace in Glen Glaster simplifies the explanation of the formation of the lakes by ice-barriers. The alluvium of Bohuntine is considered to be the gravel and mud that fell into the lake from the front of the ice when it stood at the mouth of Glen Roy during the formation of the two upper lines. During the last stage of the lake, the ice in the valley of the Caledonian Canal is believed to have constituted the main barrier, whilst the Corry N'Eoin glacier played only a subordinate part. The author suggests the possibility of a *débâcle* during the drop of water from the level of the highest to that of the middle terrace, and in support of this calls attention to the breaking down of the moraines of the Treig glacier at the mouth of the Rough Burn. He believes that when the water dropped to the level of the lowest terrace, it drained away quietly, at any rate until it receded from Upper Glen Roy. In discussing Nicol's objections, he maintains that notches would not be cut at the level of the *cols*, and observes that the discrepancy between the heights of the terraces and those of the *cols* has probably been increased by the growth of peat over most of the ground about the watersheds. The horizontality of the terraces is stated to be a fact, and cases are given where waterworn pebbles are found in connection with the "roads," these being especially noticeable in places where the south-west winds would fully exert their influence, and the structure of the terraces is considered to be such as would be produced at the margins of ice-dammed lakes. Further information is supplied concerning the distribution of the boulders of Glen Spean syenite. These are found on the north side of the Spean Valley, at the height of 2000 feet above the sea and 1400 feet above the river, and fragments of the syenite have been carried towards the north-east, north, and north-west. In an appendix, the author discusses Prof. Prestwich's remarks on the deltas, and his theory of the formation of the terraces. After some remarks from Prof. Bonney and Mr. Marr, the President said he agreed that no explanation that had yet been proposed for the parallel roads of Lochaber was free from difficulties. Yet he had long felt that these were far fewer and less formidable in the glacier theory than in any other. Had the terraces been marine, there ought surely to be similar terraces in some at least of the hundreds of sheltered glens in the Scottish Highlands, where the conditions for their formation and preservation were at least as favourable as in Glen Roy and its adjacent valleys. And though the absence of marine shells in the Lochaber shelves might not be a serious difficulty, it was hard to understand why such shells should not be found in many localities had the whole country been submerged to the height of the highest Glen Roy "road." Then no satisfactory explanation on the marine theory had ever been given of the coincidence of the terraces with well-marked *cols;* while a further formidable objection to this theory lay in the nature and distribution of the detritus of the shelves, which, in his opinion, was very unlike material arranged in a tidal sea, but was quite what might be looked for in a freshwater lake. He thought that the author's present paper lessened some of the difficulties of the glacier theory by simplifying the grouping of the ice-dams. There still remained the objection that if the Great Glen and the valleys round Ben Nevis were choked up with ice, Glen Roy and its neighbours could hardly have been filled with water. But this difficulty, which every glacialist must have felt, was probably more formidable in appearance than in reality. As Mr. Marr had pointed out, conditions did actually now exist in Greenland very similar to those which, according to the theory so ably expounded by the author, formerly existed in Lochaber.

Royal Meteorological Society, November 18.—Mr. Baldwin Latham, President, in the chair.—Mr. R. H. Scott, F.R.S., gave an account of the proceedings of the International Meteorological Conference, which was held at Munich from August 26 to September 2.—The following papers were also read:—Account of an electric self-recording rain-gauge, by Mr. W. J. E. Binnie. This is a very ingenious instrument, and has been constructed on the assumption that all drops falling from an orifice or tube are identical in weight, as long as the dimensions of the orifice are not varied.—On wet and dry bulb formulæ, by Prof. J. D. Everett, F.R.S. This is a criticism of the methods investigated some years ago by M. August and Dr. Apjohn for determining, by calculation, the maximum vapour tension for the dew point from the temperatures of the dry and wet bulb. Prof. Everett also criticizes the values adopted by Regnault, and says that, in presence of the uncertainty as to a rational formula, he thinks Mr. Glaisher did wisely in constructing his table of factors, which give the dew point approximately by the most direct calculation which is admissible. The inherent difficulties of hygrometric observation and deduction are great, and have not yet been fully overcome.—Results of meteorological observations made at Akassa, Niger Territories, May 1889 to December 1890, by Mr. F. Russell, F.R.G.S. This is in continuation of a former communication respecting the same place. After detailing the results of the various observations, the author says that this period was very unhealthy, and the year 1890 especially so. The weather was exceptionally dry, with small-pox and phthsis amongst the native population. The West Coast reports generally were also unfavourable in reference to the condition of resident Europeans, and at the principal ports quarantine regulations were put in force consequent upon an outbreak of yellow fever in places situated to the south-west. At Bonny ten deaths occurred from November to February out of a population of some sixteen Europeans.

SYDNEY.

Royal Society of New South Wales, September 2.—H. C. Russell, F.R.S., President, in the chair.—The following papers were read:—On a wave-propelled vessel, by Lawrence Hargrave.—Notes on a spontaneous disease among Australian rabbits, by M. Adrien Loir.—Notes on recent celestial photographs, by H. C. Russell, F.R.S.—Some folk-songs and myths from Samoa, by Rev. G. Pratt and Dr. John Fraser.—A quick filter without the aid of pumps was exhibited and described by W. M. Hamlet.

October 7.—H. C. Russell, F.R.S., President, in the chair. The following papers were read:—Notes on the use, construction, and cost of service reservoirs, by C. W. Darley.—Dr. Fraser presented some myths and historical records from Samoa. The myths had reference to an ancient practice of offering every day a human sacrifice to the sun, and to a chief called "Malietoa the Fierce," and showed how that was stopped. The histories were chiefly genealogies of the kings of Manu'a.

PARIS.

Academy of Sciences, November 16.—M. Duchartre in the chair.—On the secular acceleration of the moon and the variability of the sidereal day, by M. F. Tisserand. From the author's investigation it seems that the increase in the length of the day produced by tidal action is almost the same in amount as the decrease resulting from the secular contraction of the earth due to its cooling, so the length of the sidereal day remains practically invariable.—On the research on the number of roots common to several simultaneous equations, by M. Émile Picard.—On the law of intensity of light emitted by phosphorescent bodies, by M. Henri Becquerel. A correction to a formula given in a previous paper.—The heat of formation of hydrazine and of hydrazoic acid, by MM. Berthelot and Matignon. *Hydrazine*—(1) Heat of solution of hydrazine sulphate at 10°·6 is − 8·70 cal. per molecule. (2) Heat of neutralization: (*a*) by sulphuric acid + 5·55 cal. per equivalent; (*b*) by hydrochloric acid + 5·2 cal. per equivalent. Hydrazine is therefore a weak base comparable to ferric oxide. (3) Heat of combustion of 1 mol. crystallized hydrazine sulphate = + 127·7 cal. (4) Heat of formation $\frac{1}{2}N_2H_4$ = − 4·75 cal. *Hydrazoic acid*—(1) Heat of solution of ammonium salt, = − 7·08 cal. per mol. (2) Heat of neutralization: (*a*) by baryta water + 10·0 cal.; (*b*) by ammonia + 8·2 cal. Hydrazoic acid, dilute, is comparable to amidobenzoic acid, superior to hyponitrous acid. (3) Heat of combustion of the am. salt + 163·8 cal. per mol. at constant volume, and + 163·3 cal. at constant pressure, by explosion in compressed oxygen. (4) Heat of formation of am. salt: (*a*) crystallized − 25·3 cal.; (*b*) in solution − 32·3 cal. Heat of formation of the free acid in dilute solution = − 61·6 cal.—Oxidation of nickel carbonyl, by M. Berthelot. (See Notes.)—Tables of Vesta, by M. G. Leveau. A comparison of the meridian observations made of the minor planet Vesta, from January to April 1890, with positions given in the *Nautical Almanac*, and in an ephemeris computed by means of M. Leveau's tables of this planet. The tables are founded on 5000 meridian observations made between 1807 and 1888, and the masses taken for Jupiter and Mars, respectively, are 1/1045·63 and 1/3,648,000. The mean differences of position are greater in the *Nautical Almanac* than in M. Leveau's ephemeris, both in right ascension and declination.—On secular variations of eccentricities and inclinations, by M. J. Perchot.—On linear differential equations, by M. André Markoff.—On the dielectric power, by M. Julien Lefebvre. From experiments described, the following mean dielectric constants have been derived: sulphur (flower and roll), 2·6; sulphur, cast in rolls six months previously, 3·9; ice, different specimens, 3·45 and 2·4; ebonite, 2·3; paraffin, brown, 2·1, white, 2·0; petroleum, 1·9; carbon bisulphide, 1·7; spirits of turpentine, 1·5. The results agree fairly well with those obtained by Gordon. M. Lefebvre also finds that the dielectric constant of sulphur increases with the time.—On an application of photography to the polariscope, by MM. Chauvin and Charles Fabre.—Action of light on ruthenium peroxide, by M. A. Joly.—Salts formed by oxygen compounds of ruthenium inferior to ruthenic and heptaruthenic acids, by M. A. Joly.—On the iodonitroso and bromonitroso compounds of platinum, by M. M. Vèzes.—On the coloration of solutions of cobalt, and the state of its salts in solution, by M. A. Étard.—The nitration of silk, by MM. Léo Vignon and P. Sisley.—On the implanting of large pieces of decalcified bone to fill up losses of the substance of the skeleton, by M. Le Dentu. It has been found that pieces of decalcified bone substituted for a portion or the whole of a diseased bone plays the part of a temporary support which, before disappearing, allows the periosteum or the osseous tissue sufficient time to reconstruct a new bone.—On some phenomena of reproduction of Cirrhipedes, by M. A. Gruvel.—On the age of the fauna of Samos, by Mr. Forsyth Major.—On a Neolithic flint working (*exploitation*) of a new type, by M. Armand Viré.

BERLIN.

Physiological Society, October 30.—Prof. du Bois-Reymond, President, in the chair.—Prof. Gad reported on experiments, conducted under his direction by Dr. Schtscherbak, on the alteration of the movements of eating in rabbits which result from removal of certain parts of the cerebrum.

Meteorological Society, November 3.—Prof. Schwalbe, President, in the chair.—Dr. Zenker spoke on the relationship of solar radiation, as it would really occur if the sun were directly overhead and there were no atmosphere, to the actually existing and observed temperatures of stations, taking into account their proximity to oceans and continents.—Prof. Hellmann made a short communication on the recent experiments in America on the artificial production of rain.

Physical Society, November 6.—Prof. du Bois-Reymond, President, in the chair.—Dr. Raps explained certain modifications which he had introduced into his automatic mercurial air-pumps, and demonstrated the action of the pump on a Geissler tube, which he rapidly exhausted so completely that a phosphorescent light made its appearance in it.—The President made some remarks on photographs of the human retina.—Prof. Kundt described Dr. Zehnder's new and simple differential-refractor, an instrument by means of which the two rays destined to produce interference may be kept some 50 to 100 cm. apart, and be subjected separately to varying experimental conditions.

DIARY OF SOCIETIES.

LONDON.

THURSDAY, NOVEMBER 26.

ROYAL SOCIETY, at 4.30.—On Instability of Periodic Motion: Sir William Thomson, Pres.R.S.—A New Mode of Respiration in the Myriapoda: F. G. Sinclair.—Further Observations on the Gestation of Indian Rays: J. Wood-Mason and A. Alcock.—On some Variations observed in the Rabbit's Liver under certain Physiological and Pathological Circumstances: Dr. Brunton, F.R.S., and Dr. Delépine.—On the Electromotive Phenomena of the Mammalian Heart: W. M. Bayliss and Dr. E. H. Starling.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—Description of the Standard Volt and Ampere Meter used at the Ferry Works, Thames Ditton: Captain H. R. Sankey (late R.E.) and F. V. Andersen.

LONDON INSTITUTION, at 6.—On the Spread of Commerce in Europe in Prehistoric Times: Prof. Boyd Dawkins, F.R.S.

CAMERA CLUB, at 8.30.—Some Analogous Aspects of Painting, Music, and Poetry (Musical and Pictorial Illustrations): Rev. F. C. Lambert.

FRIDAY, NOVEMBER 27.

INSTITUTION OF CIVIL ENGINEERS, at 7.30.—Modern Railway Carriages: Walter Clemence.

CAMERA CLUB, at 8.—Retouching: Redmond Barrett.

SATURDAY, NOVEMBER 28.

ROYAL BOTANIC SOCIETY, at 3.45.

ESSEX FIELD CLUB, at 6.30 (at Loughton).—On some Ancient Lake Remains at Felstead, with Notes on other similar Remains in the District: J. French.—The Life-History of the Hessian Fly: F. Enock.

SUNDAY, NOVEMBER 29.

SUNDAY LECTURE SOCIETY, at 4.—How came the Great Ice Age? (with Oxyhydrogen Lantern Illustrations): Sir Robert S. Ball, F.R.S.

MONDAY, NOVEMBER 30.

ROYAL SOCIETY, at 4.—Anniversary Meeting.

SOCIETY OF ARTS, at 8.—The Pigments and Vehicles of the Old Masters: A. P. Laurie.

ROYAL MICROSCOPICAL SOCIETY, at 8.—*Conversazione.*

ARISTOTELIAN SOCIETY, at 8.—Croll's Philosophical Basis of Evolution: Arthur Boutwood.

LONDON INSTITUTION, at 5.—Recent Progress in Astronomy (Illustrated): Sir Robert Ball, F.R.S.

CAMERA CLUB, at 8.30.—Lantern Evening.

TUESDAY, DECEMBER 1.

ZOOLOGICAL SOCIETY, at 8.30.—Notes on Transcaspian Reptiles: G. A. Boulenger.—Further Descriptions of New Butterflies from British East Africa, collected by Mr. F. J. Jackson during his Recent Expedition, Part II.: Miss E. M. Sharpe.—On the Association of Gamasids with Ants: A. D. Michael.—Notes on the Bornean Rhinoceros: Edward Bartlett.

INSTITUTION OF CIVIL ENGINEERS, at 8.—Monthly Ballot for Members.—Renewed Discussion on Portland Cement and Portland-Cement Concrete: Messrs. Bamber, Carey. and Smith.

WEDNESDAY, DECEMBER 2.

SOCIETY OF ARTS, at 8.—Secondary Batteries: G. H. Robertson.

ENTOMOLOGICAL SOCIETY, at 7.—Notes on Lycæna (*recte* Thecla) Rhymnus, Tengstræmii, and Pretiosa: George T. Baker.—The Effects of Artificial Temperature on the Colouring of Vanessa urticæ and certain other Species of Lepidoptera: Frederic Merrifield.—On the Variation in the Colour of the Cocoons of Eriogaster lanestris and Saturnia carpini: W. Bateson (communicated by Dr. D. Sharp, F.R.S.).

THURSDAY, DECEMBER 3.

CHEMICAL SOCIETY, at 8.—Ballot for the Election of Fellows.—Phosphorus Oxide, Part II.: Prof. Thorpe, F.R.S., and A. E. Tutton.—On Frangulin, Part II.: Prof. Thorpe and Dr. A. K. Miller.—The Structure and Character of Flames: A. Smithels and H. Tingle.—The Composition of Cooked Vegetables: Miss K. J. Williams.—On the Occurrence of a Mydicatic Alkaloid in Lettuce: T. S. Dymond.—On some Metallic Hydrosulphides: S. E. Linder and H. Picton.—On the Physical Constitution of some Solutions of Insoluble Sulphides: Harold Picton.—Solution and Pseudo-Solution: H. Picton and S. E. Linder.

LINNEAN SOCIETY, at 8.—A Contribution to the Freshwater Algæ of the West of Ireland: W. West.—The Tick Pest in Jamaica: Dr. W. H. W. Strachan.

LONDON INSTITUTION, at 6.—The Tower of Babel and Confusion of Tongues (Illustrated): Theo. G. Pinches.

CAMERA CLUB, at 8.30.—On Toning Bromide Paper and Transparencies (with Demonstration and Illustrations): A. R. Dresser.

FRIDAY, DECEMBER 4.

PHYSICAL SOCIETY, at 5.—On a Permanent Magnetic Field: W. Hibbert.—Note on the Production of Rotatory Currents: Prof. Ayrton, F.R.S.

GEOLOGISTS' ASSOCIATION, at 8.—Supplementary Observations on some Fossil Fishes from the English Lower Oolites: Arthur Smith Woodward.—Organic Matter as a Geological Agent: Rev. A. Irving.

INSTITUTION OF CIVIL ENGINEERS, at 2.—Students' Visit to inspect the New Refrigerating Plant at Nelson's Wharf, Commercial Road, Lambeth.

CAMERA CLUB, at 8.—Retouching: Redmond Barrett.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

BOOKS.—Leçons sur les Métaux, 2nd fasc.: A. Ditte (Paris, Dunod).—Hand-book to the Geology of Derbyshire, 2nd edition: J. M. Mello (Bemrose).—Annals of British Geology, 1890: J. F. Blake (Dulau).—The Ouse: A. J. Foster (S.P.C.K.).—Hand-book of Psychology—Feeling and Will; J. M. Baldwin (Macmillan).—Index-Catalogue of the Library of the Surgeon-General's Office, U.S. Army, vol. xii. (Washington).—Electricity tested Experimentally, 3rd edition: L. Cumming (Longmans).—Problems in Chemical Arithmetic: E. J. Cox (Percival).—An Account of British Flies, vol. i. Part 2: F. W. Theobald (Stock).—A Treatise on the Geometry of the Circle: W. J. McClelland (Macmillan).—Beast and Man in India: J. L. Kipling (Macmillan).—Principles of Agriculture: edited by R. P. Wright (Blackie).—Elementary Inorganic Chemistry, new edition: A. H. Sexton (Blackie).—Euclid, Book XI.: A. E. Layng (Blackie).

PAMPHLETS.—Water and Water-Supply: J. Hopkinson (Hereford).—History of Liberia: J. H. T. McPherson (Baltimore).—The Nuptial Number of Plato: J. Adam (Clay).

SERIALS.—Zeitschrift für Wissenschaftliche Zoologie, 53 Band, 1 Heft (Williams and Norgate).—Cyclone Memoirs, Part 4; W. L. Dallas (Calcutta).—Journal of the Anthropological Institute, November (K. Paul).—Government of India Meteorological Department, Monthly Weather Review—March and April 1891 (Calcutta).—Indian Meteorological Memoirs, vol. iv., Part 7 (Calcutta).

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